color when first taken, then turns red, and lastly black; is one of the best of the southern table fishes; weight, from four to sixteen pounds.

Crab-eater, Sergeant fish (*Elacate Atlantica* Cuv.). Family of Scombridæ, or mackerels; found along the shores of the inlets, where it lurks for prey among the mangrove roots; very voracious; takes clams or mullet bait; color, silvery, with a black stripe along the sides; hence its local name of Sergeant fish; the under jaw longer than the upper; weight up to twenty pounds; a good table fish, though inferior to the former.

Whiting or King-fish (*Umbrina alburnus* DeKay). Shaped like a perch, double dorsal with strong spines; color, gray and black above, yellowish white beneath; mouth and teeth small; bottom fish of deep water; takes clam bait; very good table fish; weight, from one to two pounds.

Croker (*Micropogon undulatus* Cuv.). A southern fish of the perch family; in form, deep like the sheepshead; color, silvery; takes clam bait eagerly; weight, from one to two pounds; a good table fish.

Hog-fish, Sailor's Choice (*Hæmulon fulvomaculatum* Mitchell). Shaped like the last; a good pan fish; weight, from half a pound to a pound; takes clam bait on the bottom.

Cat-fish, of the salt-water (*Galeichthys marinus* DeKay). Handsomer in form and color than the fresh-water cat; has a forked tail and very high dorsal fin; takes fish or clam bait on the bottom; weight, 10 to 15 pounds.

Black trout (*Grystes salmoides* Lacepède). This is a fresh-water fish of the perch family, much resembling in appearance and habits the black bass of the western waters, except that it has a larger head and mouth, and grows to a larger size, say to twelve or fifteen pounds. It takes live bait, spoon or bob, which is a bunch of colored feathers with three hooks concealed among them.

Besides the above fishes, these waters contain blue fish, Spanish mackerel, beluga, mullet, Jew fish, drum, shad, lady fish, porpoise, sharks, saw fish, sting ray, the hawk's bill turtle, the soft-shelled turtle, the green turtle, clams, oysters and crabs, of various kinds. — S. C. Clarke.

GEOLOGY.

Discovery of Lower Carboniferous fossils on the Rio Tapajos. — I am just returning from a very interesting and profitable trip up the Rio Tapajos, where I have had the good luck to discover an extensive set of limestones, sandstones, and shales, of lower carboniferous age, from which I have made a very large collection of beautiful fossils. As near as I can ascertain at present, I have at least one hundred and fifty species of Brachiopods, Lamellibranchs, Polyzoons, Gasteropods, Trilobites, fishes, and a few plants, the majority of the species being determinable. Of the Brachiopods I have some magnificently preserved specimens, showing interiors. I am going back to Pará to give up my little steamer and divide up my party. I then return to the Tapajos with a very small party, including a photographer, to examine more carefully,

not only these rocks, but to study the Amazon sandstones and clays. I have seen nothing to cause me to change my opinion about the age of the last named formation. I have not succeeded in finding any fossils in them. I have found beautiful fossil leaves of apparently recent plants, in a recent ironstone. In the hill of Creré, Monte Alegre, and near Santarem, beds of basalt occur. — C. F. HARTT, *on board Government Steamer "Jurupensem," near Monte Alegre, Rio Amazonas, Oct. 5th*, 1870.

NEW FOSSIL FISHES. — Prof. COPE has recently studied the genus *Saurocephalus* and allies, from the Cretaceous, and states as a result, that these fishes are not in the least related to the *Sphyrœnidœ*, where they have been placed heretofore. The structure of the mouth is like that of the *Characinidœ*, while the neural arches are distinct and the tail vertebrated as in *Amia*. The pectoral spines have been described by Leidy, as those of a Siluroid, under the name of *Xiphactinus;* and the beautifully segmented rays referred to Ptychodus, by Agassiz, he regards as the anal or caudal rays of *Saurocephalus*. The affinities might be more correctly expressed as combining characters of Salmo and Amia. Professor Cope describes a new genus, *Ichthyodectes*, type species *I. ctenodon;* the former differs from the known genera, *Saurocephalus* and *Saurodon*, in not having the series of nutritious foramina on the inner side of the alveolar ridges. He refers these fishes to a new family, under the name of *Saurodontidœ*.

PLASTICITY OF ROCKS. — The old cobble-stone pavement in Waverly Place, between Broadway and Mercer street, being now in process of removal, my attention has been drawn to the forms of the stones, especially the harder ones, quartzites, etc. The coarser granulated paving stones have generally crumbled, but the compact stones have been modified — convex surfaces in one case fitting into concave in another; none of them retaining a normal form. Now, although the crown of these stones has been worn by the attrition of constant and heavy travel, no such wear can have taken place on their perpendicular surfaces, and I am therefore convinced that they have been moulded into one another by pressure only. On conversing with the workmen, they all concurred as to the fact, and the foreman stated that his attention had been called to it before. Very probably I am myself only repeating what is already well known to others. — GEORGE GIBBS, *New York*.

SALT PLAINS IN NEW MEXICO. — Brevet Major General August V. Kautz, U. S. Army, writing from Fort Stanton, New Mexico, informs me that there is a valley of some two hundred miles long and twenty wide, lying between the Sierra Blanca and the San Andreas and Occura mountains, in that Territory, in which there is no stream, and only a few alkaline springs and salt lakes, or ponds. Where the road from Fort Stanton to El Paso crosses it, about sixty miles south of that post, is a plain of white sand, apparently granulated gypsum, which has drifted into mounds, forty and fifty feet in height. Water of a strongly alkaline character is obtained by digging a few feet, and around the edges of this district, salt marshes exist, where in the dry seasons, great quantities of almost pure salt may be collected. The sand is so white and the plain so extensive as

to give the effect of snow scenery. As I do not remember to have seen a description of the place in print, I send you this note with a specimen of the sand forwarded by General Kautz. — GEORGE GIBBS, *New York.*

MICROSCOPY.

A NEW FORM OF BINOCULAR FOR USE WITH HIGH POWERS OF THE MICROSCOPE.* — Of the several forms of binocular arrangement for the microscope which have hitherto been constructed, only such as are adapted for use with low powers exclusively, have as yet come into general use. Of these, the Wenham prism is the popular favorite, and hardly any other form is employed at all by British or American constructors. Mr. Wenham's binocular, when employed with powers below about one-half inch, leaves nothing to be desired; but with higher powers than this, the field is so imperfectly and so unequally illuminated that it ceases to be available.

The Wenham binocular, like the original binocular of Dr. Riddell, and like the different forms constructed by Mr. Nachet, divides the light, after it has passed the objective, by a vertical section passing through the middle of the entire bundle of pencils, into two equal portions, one of which is directed to each eye. But although the entire body of the light is thus equally divided, the same is not true of the several pencils which make it up. Only those pencils in fact can undergo equal division whose radiant points in the object lie exactly in the plane of the section. All others will be divided unequally, and the inequality will be greater in proportion as the radiants are more distant from that plane. If the division could be effected at the centre of the front lens of the objective, the inequality just spoken of would disappear; but such a division is of course impracticable. With objectives of low power, the base of each conical pencil of rays (which is the area of the front lens of the system) is so large, that the inequality of illumination consequent upon the unequal division of the pencils themselves is not sufficiently great to be objectionable; but with high power objectives, the pencils are very slender; and at the distance behind the combination at which it is necessary to place the binocular construction, many are very disproportionately divided, and many escape division altogether.

By the introduction of an erector into the body of the microscope, the pencils, which cross each other once in entering the front lens of the combination, may be made to cross a second time; and it is obvious that if the dividing apparatus of the binocular be introduced at the point of this second crossing, all the pencils will be divided with the same equality as they would be if the division could be effected at the centre of the front lens itself. Availing himself of this principle, Mr. Tolles, some years since, constructed a binocular eye-piece which solves completely the optical problem under consideration for all powers; but this instru-

* Read by F. A. P. Barnard LL. D., President of Columbia College, N. Y., before the Microscopical Section of the American Association for the Advancement of Science, Troy meeting.